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# STATION NOTES

## CENTRAL STATES FOREST EXPERIMENT STATION

### COLUMBUS 15, OHIO

No. 46



June 1948

#### PLANTED BLACK LOCUST ON CLAYPAN SOILS OF SOUTHERN ILLINOIS.

During the period 1936 to 1938 a company planted about 100 acres of black locust on claypan lands in Franklin County, Illinois. Since 1947 most of these plantations have been clear-cut and the areas planted to shortleaf pine. The locust was stagnated, broken, riddled with borers, and many trees were dead. Hardly a single good post or prop per acre had been produced or could be expected (See Fig. 1 on next page). The company decided to clear the land (See Fig. 2), and plant it to a species for which it is better suited.

Only a word is necessary to explain why black locust failed. The areas planted are nearly flat and have a claypan soil which consists of a thin layer of gray or yellowish-gray, strongly leached topsoil resting on an almost impermeable subsoil of light gray clay. On the plantation sites the light gray, impermeable subsoil is about 12 inches below the surface. A few crawfish holes are present, and these alone are reliable indicators of an impermeable subsoil and poor internal drainage. The dark-colored topsoil is about 5 inches thick in the plantations. Both the surface soil and subsoil are highly acid, the pH ranging from 4.5 in the subsoil to 5.5 in the surface layer. Soils of this kind extend in a broad band across southern Illinois generally between U. S. Highway 40 and State Highway 13, and into southwestern Indiana.

The above description shows that nearly every soil requirement of black locust is absent on the planting areas. To succeed, black locust plantings should be made on deep, well-aerated, reasonably "sweet" soil with good internal drainage. The claypan soils are not ideal for any tree species, but evidence indicates that shortleaf or loblolly pine would at least make mine props.<sup>1/</sup>

The 10 to 12 years of locust growth had some good effects on the site. The most noticeable was the greater looseness and friability of the topsoil and the rather rank growth of weeds and briars (See Fig. 1). The pH was raised one-half to one point above that of adjacent open fields and nearby pine plantations. The topsoil seemed slightly deeper under the locust but data were insufficient to justify a conclusion.

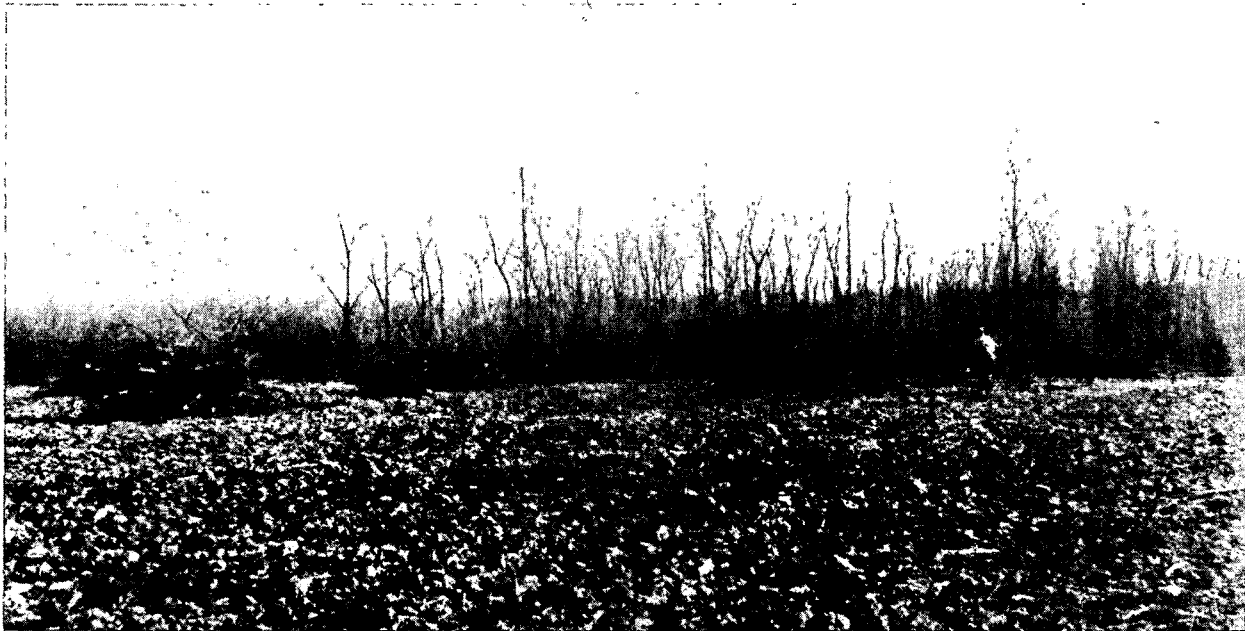
The conversion to pine cost about \$50.00 per acre. To this must be added the original cost of the locust planting, the carrying charges on land and investment for 12 years, and the loss of locust production for 12 years. The total indicates a very expensive job of land-management correction, and shows in a vivid way how inadequate information regarding site requirements of species can result in a real cash loss.

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<sup>1/</sup> Planted Pines on Claypan Soils of Southern Illinois, Central States Forest Experiment Station Note No. 44.



**Figure 1. Black locust plantation 12 years after planting. This plantation has no value except for firewood. Impervious clay-pan is only 12 inches below surface.**



**Figure 2. Land after clearing the planted locust, burning brush, and disking. This area will now be planted to shortleaf pine. Additional clearing is being done in background.**

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